

R E M A R K S

The office action of September 25, 2008 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 7 through 12 remain in this case. A supplemental information disclosure statement is being filed with this request for continued examination.

The numbered paragraphs below correspond to the numbered paragraphs in the Office Action.

Rejection under 35 U.S.C. §103

3. Claims 7-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Graupe (5,016,635). Applicant respectfully disagrees with this rejection.

The present invention is characterized by mimicking the stimulation (output) signals imposed on biological tissues by those elicited by the native organism. This is accomplished by calculating the output signal by the convolution between the impulse response (responsiveness of the native organism to the input signal) and the corresponding input biosignal. The impulse response is preferably obtained beforehand, by the inverse Fourier transform of the transfer function, which in turn is obtained by dividing the Fourier transformed output signal by the Fourier transformed input signal.

The impulse response quantifies the biological responsiveness (the relationship between output and input) rather than the biosignal itself or information derived from a single biosignal. The impulse response quantifies the relationship between at least two biosignals. The meaning, the dimension and the unit of the impulse response may therefore differ considerably from those of the biosignal itself. Because the convolution is used to predict the output signal, the calculation is preferably performed between impulse response and the corresponding input signal.

Claim 7 includes, in part, “b) a calculating means which receives the biosignals, calculates a plurality of signals for stimulation of an organism using a convolution integral between at least one impulse response previously obtained from normal biological activities and

the biosignals, and outputs the signals for stimulation of the organism; wherein the impulse response is calculated from an inverse Fourier transform of a transfer function which is based on a Fourier transform of the biosignals” and claim 12 includes, in part, “b) a calculating means which receives the biosignals, calculates a plurality of signals for stimulation of an organism using a convolution integral between an impulse response previously obtained from normal biological activities and the biosignals, and outputs the signals for stimulation of the organism; wherein the impulse response is calculated from an inverse Fourier transform of a transfer function which is based on a Fourier transform of the biosignals.”

In the present invention, the impulse response should be obtained beforehand, by the inverse Fourier transform of the transfer function, which in turn is obtained by dividing Fourier transformed output signal by Fourier transformed input signal. Heart rate and blood-pressure response of an organism can be mimicked by obtaining the impulse response (See figure 3 etc).

On the other hand, the invention described in Graupe obtains the impulse response from the output signal, which is obtained by inputting an impulse-like input signal to a native organism. In contrast to the present invention, however, it is difficult to obtain an impulse response that precisely mimics the responsiveness of the native organism to the input signal.

This is because the present invention calculates the impulse response as follows. The invention obtains the impulse response by adding white noise to the native organism as an input (biosignals). The invention obtains the impulse response by dividing time series into a plurality of segments and statistically processing them.

The impulse response in claims 7 and 12 and the impulse response described in Graupe are totally different. In addition, these differences allow the present invention to precisely mimic the responsiveness of the native organism to input signal, while Graupe’s invention is unable to do so.

In addition, the present invention uses the impulse response to directly calculate signals for stimulation of an organism. On the other hand, the invention described in Graupe controls the native organism (so called feedback control) by using the following steps. Graupe uses the impulse response to perform pattern recognition of the native organism. Graupe then uses the

result of the pattern recognition to increase the output from the native organism. Based on the result of the pattern recognition to increase the output, Graupe's invention controls the output.

Graupe's process needs to go through a plurality of steps to obtain signals for stimulation of an organism, while the present invention directly calculates the signals for stimulation of an organism. Therefore, the present invention can control the native organism more promptly and stably than the invention in Graupe.

The present invention enables a precise prediction of the native response to the input signal. The effect of predicting and mimicking the native biological response by an artificial device is not taught or suggested in Graupe.

Therefore, it is respectfully suggested that claims 7 and 12 are not obvious over Graupe. Dependent claims 8-11, being dependent upon and further limiting independent claim 7, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with Applicants' attorney would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

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